MEASURING THE DECELERATION PARAMETER FROM COSMOLOGICAL REDSHIFT DISTORTION OF GALAXY CORRELATION FUNCTION AT SMALL REDSHIFT

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We present a formula to infer the value of the deceleration parameter q_0 from the anisotropy in the galaxy correlation function at small redshift:

$$1 + q_0 \simeq \beta_0^2 \frac{d_1}{\Delta} + (\beta_0 + \tfrac{1}{3}\beta_0^2)\frac{d_2}{\Delta} + (1 + \tfrac{6}{7}\beta_0 + \tfrac{3}{35}\beta_0^2)\frac{d_3}{\Delta}, \qquad (1)$$

where $\beta_0 = \Omega_0^{0.6}/b$, and d_1, d_2, d_3 and Δ are written in terms of the multipole components of the redshift-space correlation function $\xi_s(s,\nu)$:

$$\zeta_{2l}(s;z) := (2l + \tfrac{1}{2}) \int_{-1}^{1} d\nu \, P_{2l}(\nu)\, \xi_s(s,\nu;z), \qquad (2)$$

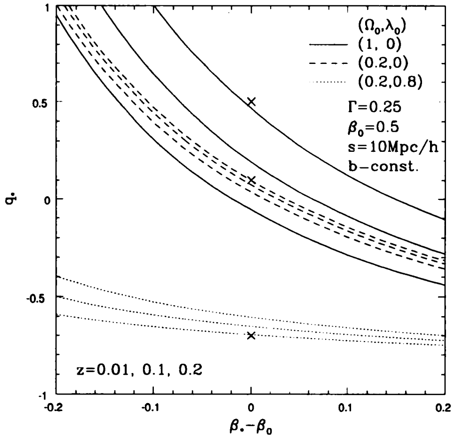

Figure 1. Inferred value q_* of the deceleration parameter q_0 from equation (1), versus β_* which is substituted for $\beta_0 = \Omega_0^{0.6}/b$ in the right hand sides of equation (1). The crosses indicate the location of the true values of $q_0 = \frac{1}{2}\Omega_0 - \lambda_0$.

The present method does not require any assumption of the shape and amplitude of the underlying fluctuation spectrum, and thus can be applied to future redshift surveys of galaxies including the Sloan Digital Sky Survey. More details are found in Nakamura, Matsubara & Suto (1998, ApJ 493 in press)

K. Sato (ed.), Cosmological Parameters and the Evolution of the Universe, 258.

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